claims, which might make some of the drawing objections unnecessary. Further, the Office Action does not specify which claims are not illustrated by the drawings. When the prior art rejections have been resolved, it will be more clear which claims remain in the case, and accordingly, which features if any are not illustrated by the drawings.

New Title

The Examiner required a more descriptive title. A new title is being supplied herein.

Claim Formalities

The Examiner rejected claims 52, 58 and 78 on the ground that it was not clear to the Examiner whether they were intended to claim a brush support or a motor. Each of these claims has been rewritten in independent form and recites a combination of a motor and brush assembly.

Claims 52 and 58 were objected to under 37 C.F.R. 1.75(c) on the separate ground that they fail to further limit the subject matter of a previous claim. In view of the amendment mentioned above, claims 52 and 58 are submitted to be in proper form.

Claims 53, 56, 65 and 76 were objected to on the ground that they "fail to further limit Claim 43 because they merely recite functional claim language without providing additional structural limitations." Each of these claims has been amended to recite (quoting claim 76 as an example) that a pair of brush bodies, having different resonant frequencies (as recited in a respective parent claim), "remain in reliable electrical contact between said ... supports and said commutator" of an electric motor, "thereby reducing interface resistance between the brushes and the commutator, despite oscillations of the supports and brushes which occur in response to rotation of said commutator."

There is no per se objection to "functional" language in claims. In re Swinehart, 169 U.S.P.Q. 226 (CCPA 1971). According to the CCPA in Swinehart, there is nothing wrong with a patent claim defining an invention by what it does. In the

present case, the applicants have developed a structure defined in the parent claims, which operates as recited in claims 53, 56, 65 and 76. The references do not apparently disclose brush assemblies that carry out the operations recited in claims 53, 56, 65 and 76. These claims accordingly are in proper form, and further are allowable over the art of record.

In view of the foregoing, the formal rejections of the claims are requested to be withdrawn.

Prior Art Rejections

Claims 43-46, 52-60, and 76-80 were rejected as being unpatentable over the combination of Kobayashi and Pfatischer. Claims 47, 49, 71 and 73 have been rejected over the first group of references, and further in view of Muller et al. Claims 51 and 75 were rejected over the first group of references, and further in view of Mabuchi. Claims 61-70 have been rejected as being obvious over the first group of references, and further in view of Baines.

These rejections are respectfully traversed. Each of independent claims 43, 59 and 77 discloses features that are neither disclosed nor suggested by the cited combinations of references, inclding the feature (quoting claim 59 as an example) that:

> said first support and brush having a first resonant frequency, said second support and brush having a second resonant frequency, and said first and second resonant frequencies being different.

Pfatischer does show a motor with two sets of brushes, each set comprising a copper brush and a carbon brush arranged so that the copper brush on one set touches the commutator on the same path as the carbon brush of the other set and vice versa. However, there is no discussion or disclosure as to how the brushes are sprung, nor their resonant frequencies. Both brushes of each set are shown rigidly fixed to a brush support arm. Therefore, it must be assumed that the brush support arm itself is sprung. In that case, it appears that both brushes of each set would bounce together at the same frequency, regardless of

the respective individual weight, mass, or size of each of the brushes.

It is speculative to draw any conclusion about resonant frequencies from Pfatischer's disclosure. Nothing is said in the reference about resonant frequencies. The stated purpose of using copper brushes and carbon brushes is that the carbon brushes will lubricate the copper brushes and polish the commutator, while the copper brushes will provide a low electrical resistance and maintain the circuit when the carbon brushes break. In fact, Pfatischer's disclosure seems to assume that the brushes will not bounce at al. In view of the different respective materials, shapes, lengths and mounting angles of the copper and carbon brushes in Pfatischer, and the apparent absence of any spring-mounting, there is simply no basis for a conclusion that the copper and carbon brushes have different resonant frequencies. They might as well have the same resonant frequency for anything that is said in the reference.

The Examiner's "Official Notice" regarding the densities of Cu and C is noted. However, the Examiner's "Official Notice" does not satisfy the requirements of 37 C.F.R. 1.107(b). Information within the personal knowledge of the Examiner, and not supported by any references, should be set forth in detail in an affidavit of the Examiner, in this case in a new, non-final Office Action. The affidavit should specify why the Examiner's information is combinable with the other references, and what the references would add up to if combined. The affidavit is required in order to fairly disclose the Examiner's unrevealed personal information to the applicant and enable the applicant to determine whether the combined information does in fact support a rejection of the claims, and if not, to prepare an appropriate traversal of the rejection.

In this case, when Pfatischer fails to disclose anything about resonant frequencies, nor any motivation to provide any particular resonant frequencies, and Pfatischer's sets of brushes may even have the same resonant frequency, the "Official Notice" regarding the properties of C and Cu cannot

provide any motivation to a skilled individual to actually use C or Cu, nor any knowledge of what such use would accomplish.

Kobayashi shows a coil spring brush arm. Kobayashi teaches using three strands of spring wire welded or glued together and then coiled into a spring to give a single spring brush arm for pressing a brush into contact with the commutator. The brushes are precious metal contacts fixed to the end of the spring arm. It is not conceivable how Kobayashi could be combined with Pfatischer.

Kobayashi's Figure 2 referred to by the Examiner is prior art. The precious metal brush tips 8 are fixed to a pivot plate 4 which is rotated by means of a single spring 6. No indication is given as to how a difference in the mass of the brushes would result in different resonant frequencies, because both brushes are rigidly connected to the same plate which is driven by a single spring.

The combination, if it could be made (which is questionable), would not each nor suggest a set of brushes supported by resilient arms wherein each arm and brush combination has a different resonant frequency.

Claims 44 to 50 provide various methods of achieving this difference in natural resonance frequency.

Muller does teach the avoidance of simultaneous contact breaking of a dual arm slip ring wiper by making the arms of different lengths as claimed by the Examiner. However, there is no suggestion to add a brush body to the ends of the wiper arms.

Claim 47 refers to the arms having different resilience. This is not taught nor is it discussed in any way in any of the citations. In Muller, both arms must have the same resilience as they are different ends of the same spring.

Claim 49 refers to differences in dimensions to produce differences in resilience. The only difference mentioned by Muller is a difference in length and this does not result in a difference in resilience of the wiper because the distance between the fixed point (pin 3) and the contact point (with the slip ring) is the same for both arms and thus, resilience between

these two points is also the same as they are the same material and have the same cross-sectional area.

Similar comments apply to Claims 71 and 73.

Conclusion

In view of the foregoing amendments and remarks, the Examiner is requested to withdraw the outstanding objections and rejections and allow claims 43-80.

I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: Commissioner of Patents and Trademarks, Washington, D.C. 20231, on September 2, 1998:

James A. Finder
Name of applicant, assignee or Registered Representative

Signature

September 2, 1998
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Respectfully submitted,

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